SIEMENS

MAMMOMAT 3000

SP

Stereotactic Biopsy Attachment

Programming and Tests

RXB7-230.113.01.03.02
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English
11.97

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Foreword

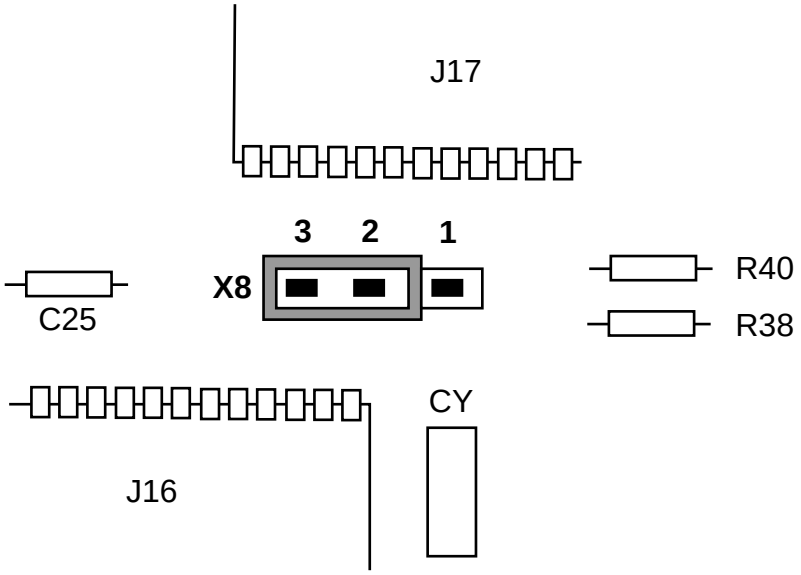
Meters and aids required

- Pocket terminal PT 510 (82 27 684 RE999) or Service PC
- Stereo phantom

Notes

These instructions describe all program modules (flow diagrams) for start-up and servicing.

The jumper X8 in the evaluation unit on board D11 must be changed over from 1-2 to 2-3. (This position is marked on the PC board). Plug the jumper back to 1-2 after completion of programming in order to write disable the EEPROM.



Caution

Enter the values programmed in the program modules into the corresponding protocols!

After completed programming, finally execute the EEPROM “SUMCHECK” module 14 (see page 27).

Leave these instructions with the system!

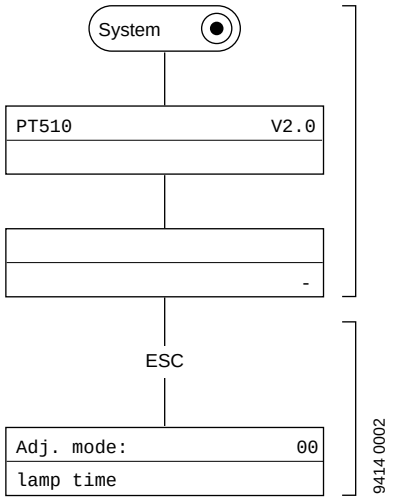
Start-up of the pocket terminal PT 510

Connecting the PT 510 to the stand

Connect the PT 510 connection cable to the rear of the evaluation unit.

Switching on the PT 510 and selecting the module level

Turn on the evaluation unit.



Switching on the PT 510

Switch on the system at the desk and wait for initiation. The version number appears in the PT 510 display for a short time. Subsequently, a blinking cursor appears.

NOTE

If the system is turned off with the pocket terminal connected, wait approximately 5 seconds before switching it on again.

Operation of the pocket terminal

Keyboard function

Function keys

The lower keys of the keyboard are used for entering commands to control the program run.

Key	Function	Effect/Remark
SHIFT	Selection of the 2nd keyboard level	The white characters above the keys are active
CTRL	-	-
FNC	-	-
DEL	-	-
ESC	Selection of the 1st mask of a module	Termination of a modular sequence
CR	Acknowledgement of an entry or function	The next function (display mask) is called up
⇓	-	-
⇑	-	-
⇐	-	-
⇒	-	-

Table 1 Function keys

Character keys

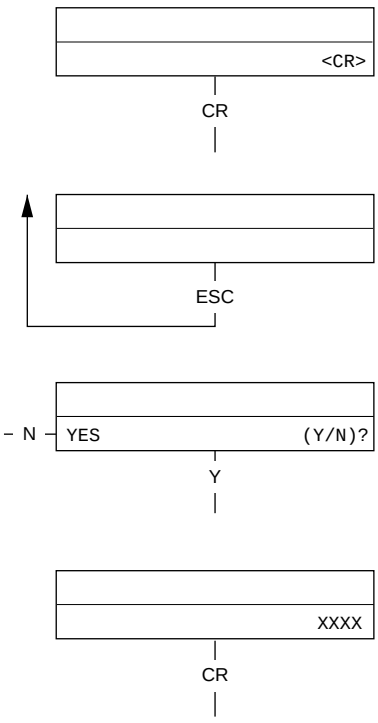
The remaining keys of the keyboard are used for entering numbers and letters at the position marked by the cursor “___”.

Operation of the pocket terminal

Function of the display

Operator guidance

In the last positions of the 32-digit display, the characters for the “Operator guidance” are indicated in each display mask. These indicate the entries to be expected.



Acknowledgement with CR:
Acknowledge the indicated function with CR; in doing so, select the next function (mask).

Acknowledgement with ESC:
Escape from the indicated function with ESC. The 1st mask of the module is selected.

Branch with “Y” or “N”:
With SHIFT Y (yes) or with SHIFT N (no) select another program branch in each case.

Entry of another value

Keep the value (e.g. if “0010?” is displayed):
Acknowledge with CR.

Change the value (e.g. if “0010?” is displayed):
Enter the new value instead of the value (overwrite old value, e.g. with “1050”)*
Acknowledge with CR.

**** NOTES***

Enter the value so that it is aligned to the right. If necessary, “0”-fill the sequence of numbers to the left.

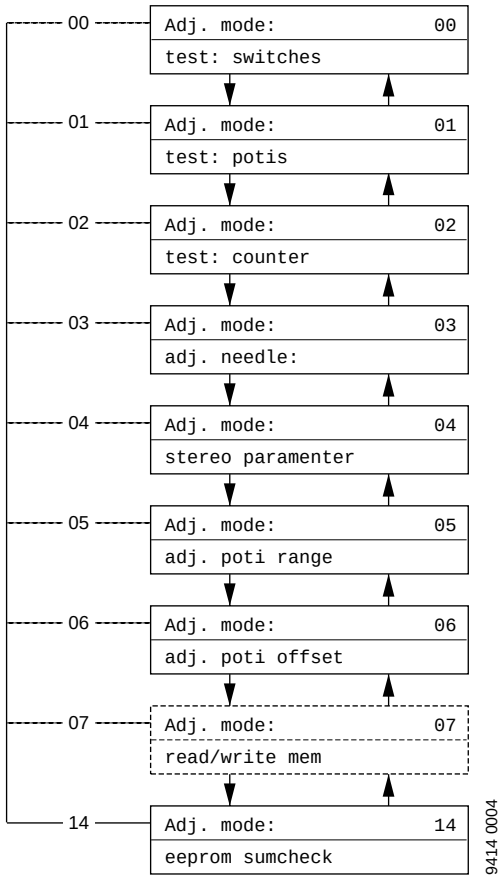
If a wrong value was unintentionally entered, overwrite this value with the correct value.

Cursor

The cursor indicates the specific character to be changed or deleted in the input field of the display.

Programming mode with the pocket terminal

Survey of program organization (module tree)



Checking the push button switches in the evaluation unit

Checking the potentiometer in the biopsy unit

Interrogating the current counter readings of the evaluation unit

Programming the desired needle lengths

Programming the system specific data

Programming the minimum and maximum potentiometer positions of the biopsy unit

Matching the evaluation unit to the “actual-value” potentiometers of the biopsy unit

For laboratory purposes only

Matching the EEPROM SUMCHECK memory

Programming mode with the pocket terminal

Selecting the modules

The “module tree” provides a survey of the selectable modules for start-up and service.

For selection of a module, there are two possibilities:

1 Selection via the module number
Enter the number of the desired module, e.g. “03”. The 1st mask of the module, e.g. “Adj. mode: 03 adj. needle” is displayed.

2 Selection with key ⇑ or ⇓
With key ⇑ select the next higher module, e.g. “04” or with key ⇓ the next lower module, e.g. “02”.

Module sequences and protocols

Notes on programming

- During initial start-up and checking in the factory (Test Department), the following modules must be executed in the sequence indicated:
03 - 05 - 06 - 07 - 14.

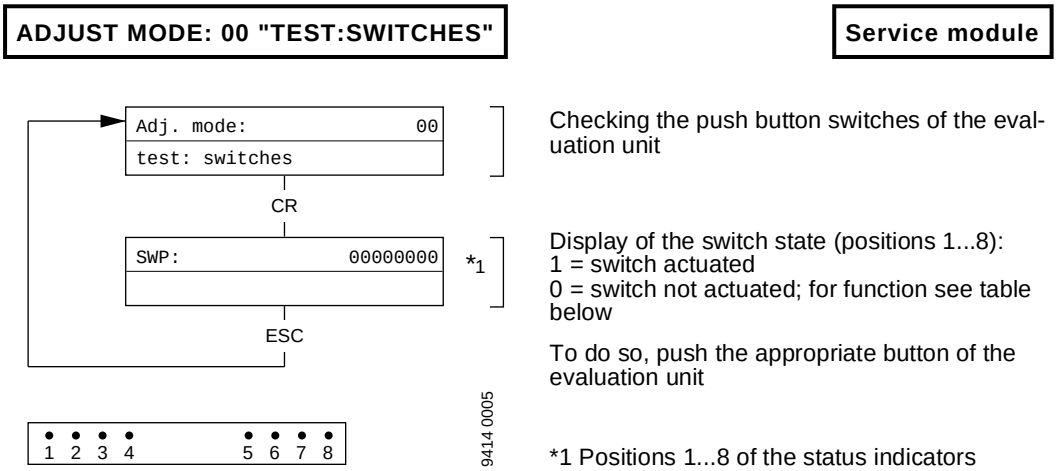
- Enter the programmed complete data of the individual modules into the corresponding protocols (even the data from the test certificate). This facilitates future modifications and servicing of the system, e.g. if circuit board D11 or EEPROM is defective.

- Once a module has been started, it should always be executed until the end (up to the 1st mask). If necessary, a modular sequence can be terminated with the ESC key.

- After completion of the programmings and tests, call up and execute the module 14 “EEPROM SUMCHECK”, (see page 27).

Programming mode with the pocket terminal

Module 00 “TEST: SWITCHES”


ADJUST MODE: 00 "TEST:SWITCHES"
Service module
Adj. mode: 00
test: switches
CR
SWP: 00000000
*1
ESC
1 2 3 4 5 6 7 8
9414 0005
Checking the push button switches of the evaluation unit
Display of the switch state (positions 1...8):
1 = switch actuated
0 = switch not actuated; for function see table below
To do so, push the appropriate button of the evaluation unit
*1 Positions 1...8 of the status indicators

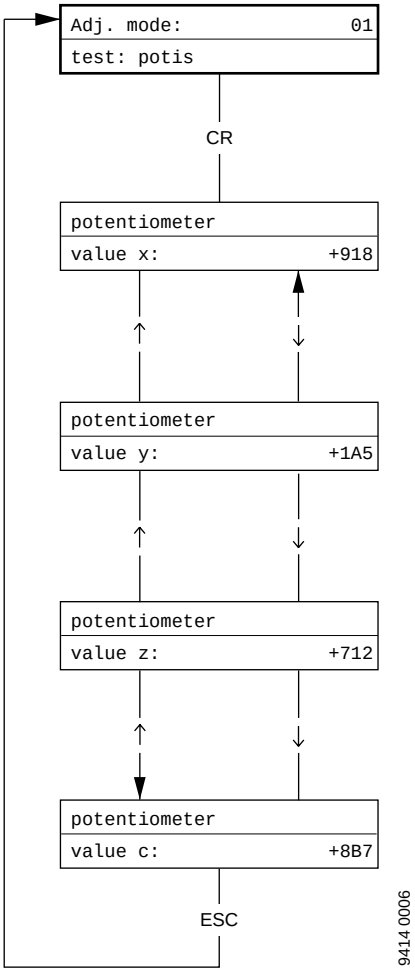
Position	Switch no.	Push-button switch in the evaluation unit
1	-	Not allocated
2	-	Not allocated
3	-	Not allocated
4	S5	“POSITION SET”
5	S4	“ZERO SET”
6	S3	Locking of the film
7	S2	Needle length “–”
8	S1	Needle length “+”

Table 2 Function keys

Module 01 “TEST: POTIS”

Service module

ADJUST MODE: 01 "TEST: POTIS"



Checking the potentiometers in the biopsy unit

Display of the “actual” value of the potentiometer of the potentiometer of the “X” coordinate

Display of the “actual” value of the potentiometer of the potentiometer of the “Y” coordinate

Display of the “actual” value of the potentiometer of the potentiometer of the “Z” coordinate

Display of the “actual” value of the potentiometer of the potentiometer for the compression path

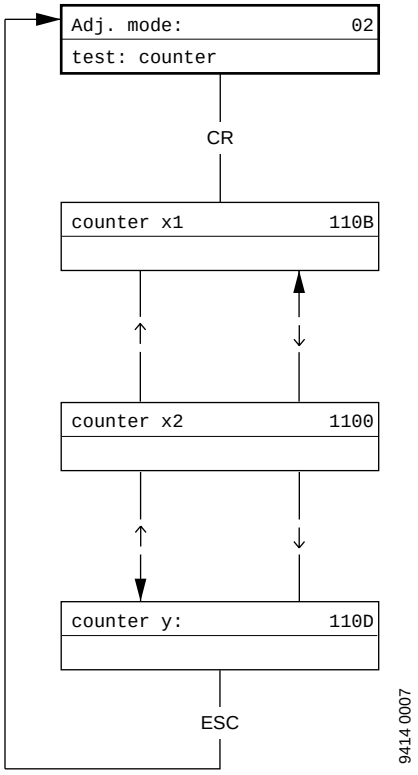
NOTE

The indicated values (hexadecimal code) are examples!

Programming mode with the pocket terminal

Module 02 “TEST: COUNTER”

ADJUST MODE: 02 "TEST:SWITCHES" **Service module**



Checking the current counter readings in the evaluation unit

Checking the position of the “actual” value transmitter of the right X coordinate

Checking the position of the “actual” value transmitter of the right X coordinate

Checking the position of the “actual” value transmitter of the Y coordinate

NOTE

The indicated values (hexadecimal code) are examples!

Programming mode with the pocket terminal

Module 03 “ADJUST: NEEDLE”

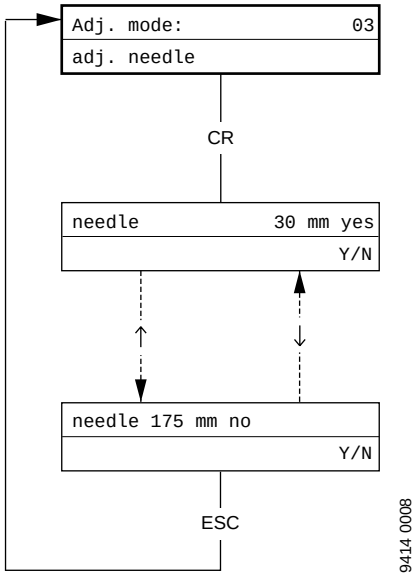
NOTE

Needle lengths of 30-100 mm have already been programmed by the factory in steps of 10 mm.

In this program, the needle lengths to be used are programmed.

Needle lengths ranging from 30 mm to 175 mm can be programmed in steps of 1 mm. Any number of needles can be programmed. The needle lengths to be programmed can be called up by pressing the “+” or “–” key. The current needle length is displayed.

Adjust module



ADJUST MODE: 03 "ADJ.NEEDLE"

Insert needle into the needle holder and measure the length to the upper edge of the needle holder when the needle point just touches the table.

The desired needle lenghts can be called up either successively by means of the ⇑ or ⇓ keys
or
can be programmed directly with the DEL key after deletion of the displayed value

Acknowledge the desired needle lengths with Y (Yes)

Delete undesired needle lengths with N (No)

The programmed needle lengths can be interrogated via the ⇒ or ⇐ keys

NOTE

Likewise, the programmed needle lengths can be interrogated by pressing the +/– keys on the evaluation unit. The values are displayed in the upper display field.

Protocol

ADJUST MODE: 03 "ADJ.NEEDLE"

Programmed needle lengths:	Date: Signature:
.....	.....

9414 0009

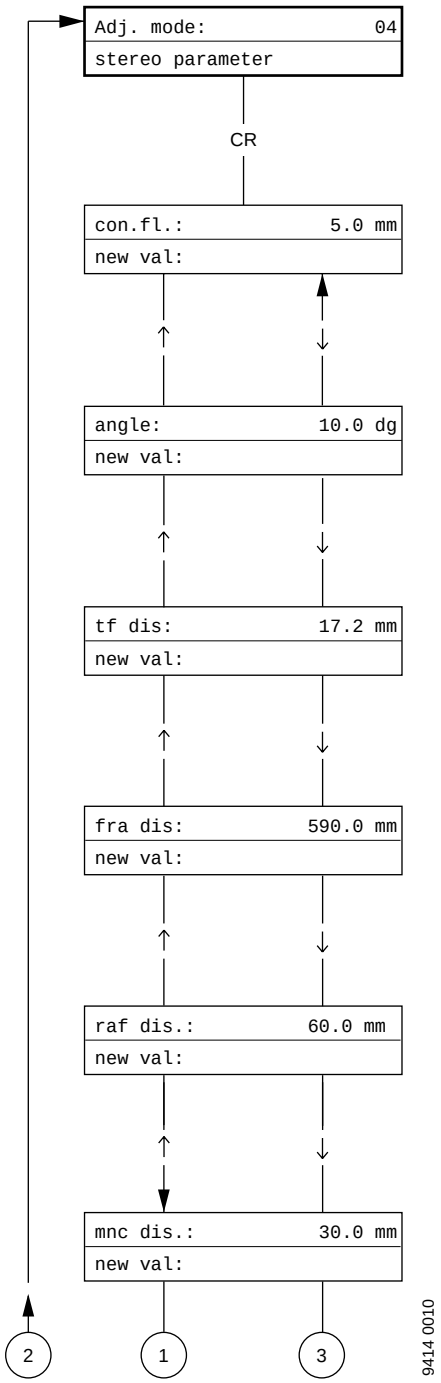
Programming mode with the pocket terminal

Module 04 “STEREO PARAMETER”

In this program, the system specific parameters are programmed.

Deviations from the indicated values are allowed in exceptional cases only!

ADJUST MODE: 04 "STEREO PARAMETER" **Adjust module**



Maximum flexure of the compression plate

Swivel angle for the tube assembly (factory-set to 10°)

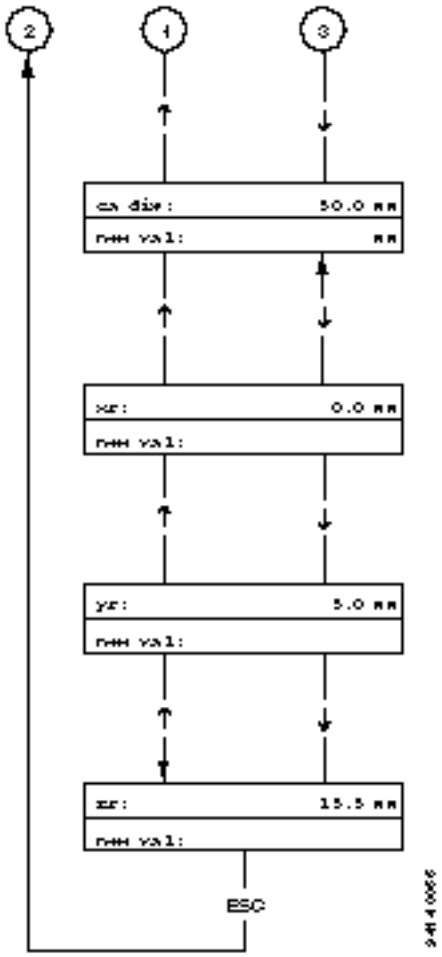
Distance between upper side of object table and film plane (zr + 1.7 mm, see last parameter on page 14)

Distance between focus and axis of swivel bracket

Distance between axis of swivel bracket and film

Minimum distance between needle point and bottom edge of compression plate (Z coordinate)

Programming mode with the pocket terminal

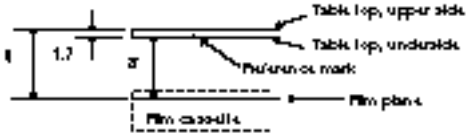


Distance between bottom edge of compression plate and object table

Position of the reference mark engraved in the object table relative to the film on the X coordinate

Position of the reference mark engraved in the object table relative to the film on the Y coordinate

Average distance between the reference mark engraved in the object table and the film plane on the Z coordinate (differs with the cassette type used). This example refers to Kodak Min R cassette.



Protocol

ADJUST MODE: 04 'STEREO PARAMETER'

Programmed angle, if changed: angle:_____ dg	Date: Signature: _____
Type of cassette used: _____	

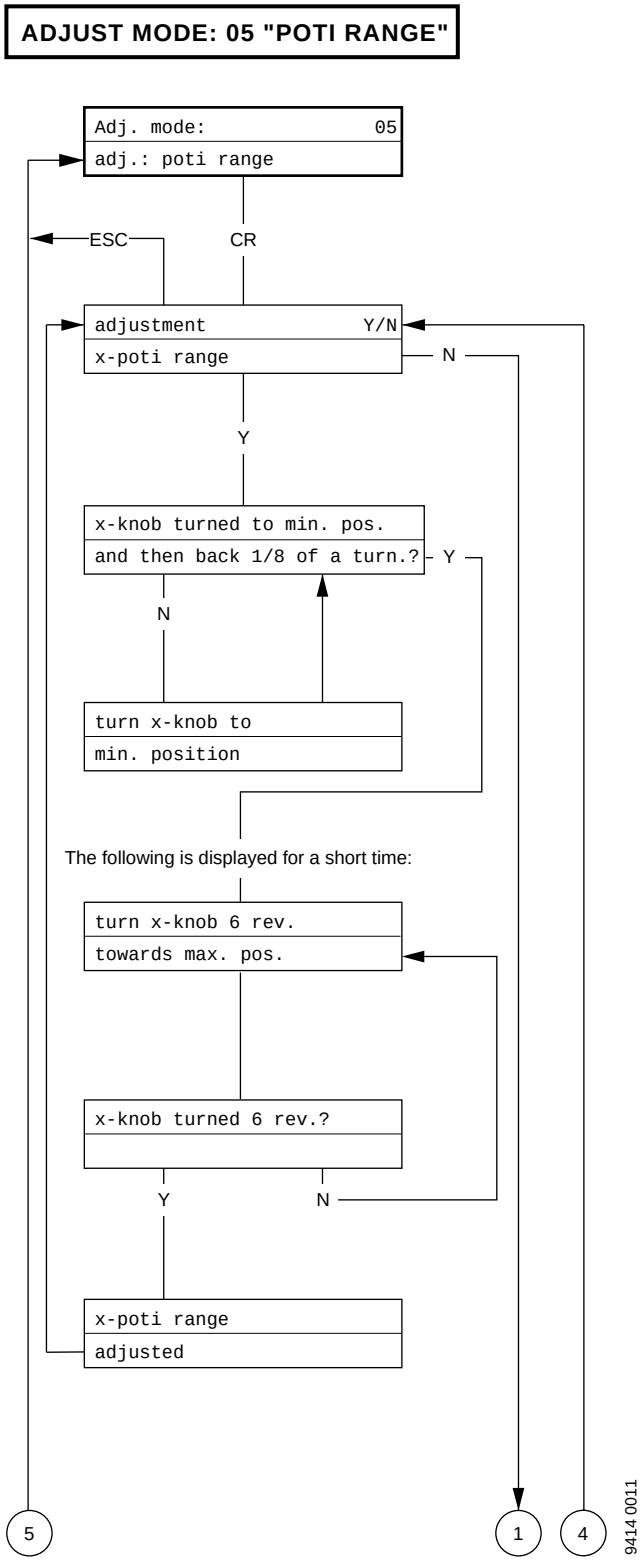
CAUTION

It is now essential to perform the Adj. Mode 14 "SUMCHECK"! Then switch the evaluation unit off and on again. In this way the data are taken over for the further programming steps.

Programming mode with the pocket terminal

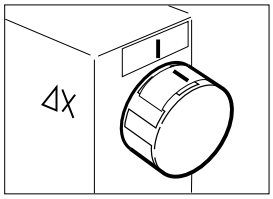
Module 05 “POTI RANGE”

In this program, the minimum and maximum potentiometer positions for the X, Y and Z coordinates of the biopsy unit are programmed.



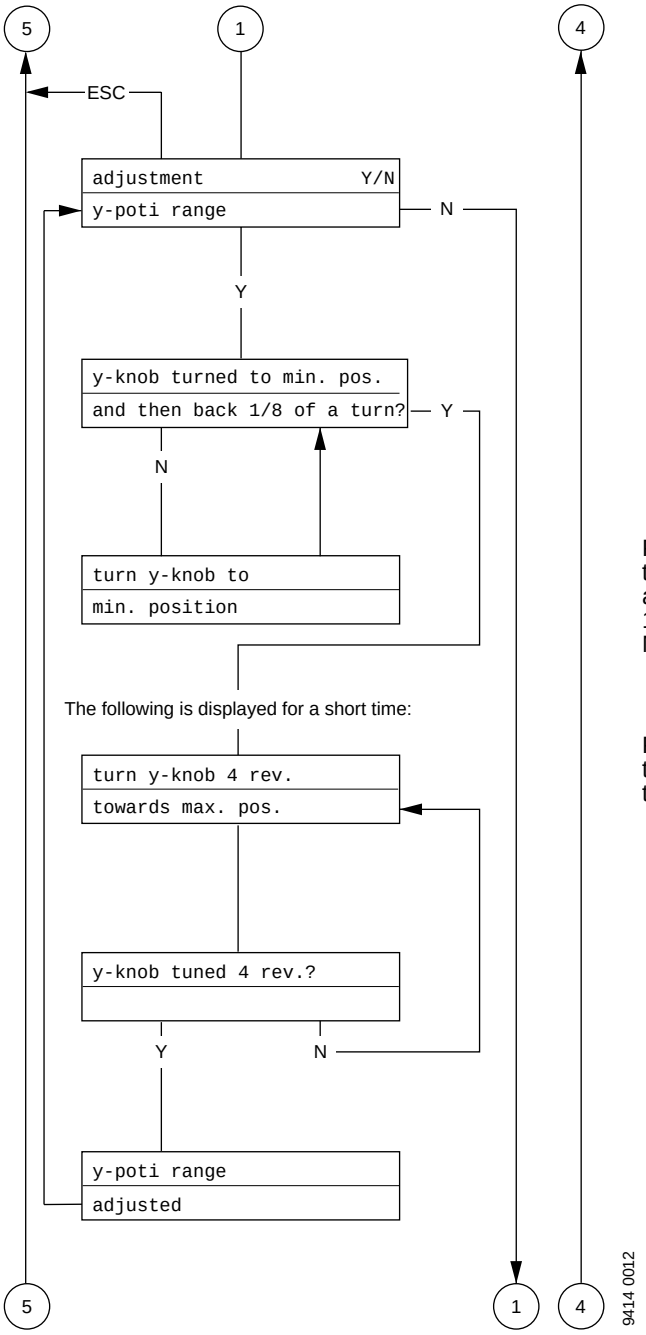
Adjustment of X potentiometer

On the biopsy unit:
Position the needle holder with the setting knob for the X coordinate all the way to the left and back 1/8 of a turn. Mark the knob position as shown below.



Position the needle holder with the setting knob for the X coordinate by six turns to the right.

Programming mode with the pocket terminal

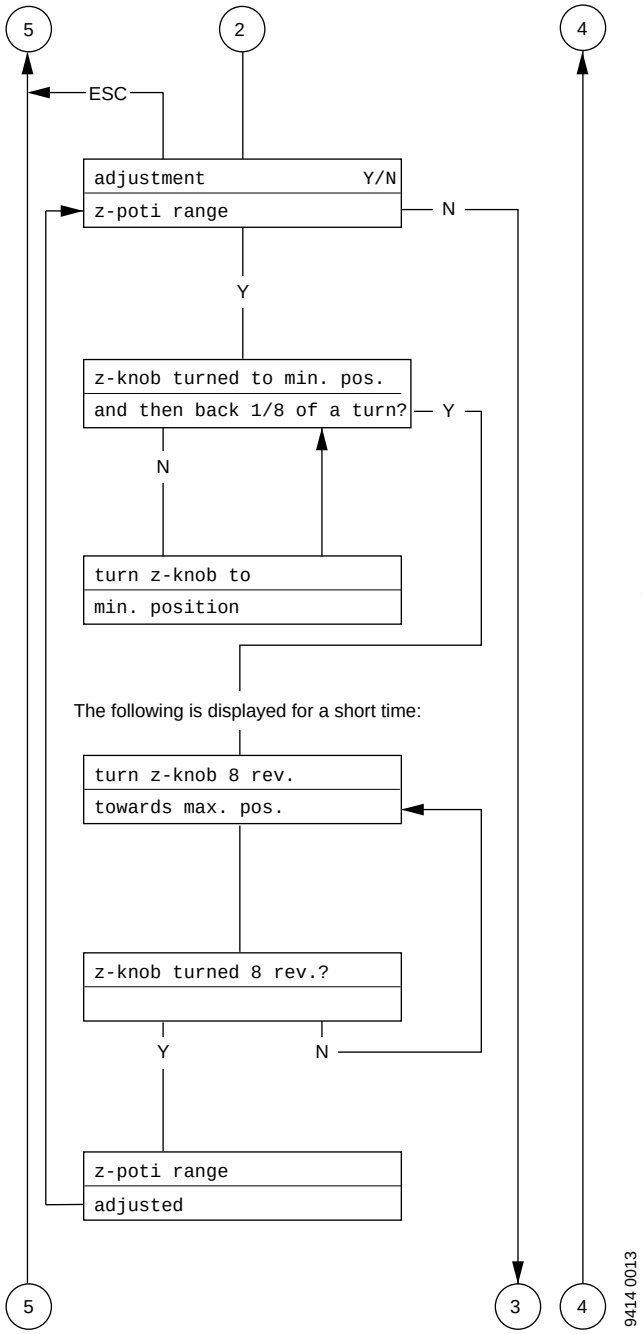


Adjustment of the Y potentiometer

Position the needle holder with the setting knob for the Y coordinate as close as possible to the chest wall and back 1/8 of a turn.
Mark the knob position!

Position the needle holder with the setting knob for the Y coordinate by four turns away from chest wall.

Programming mode with the pocket terminal

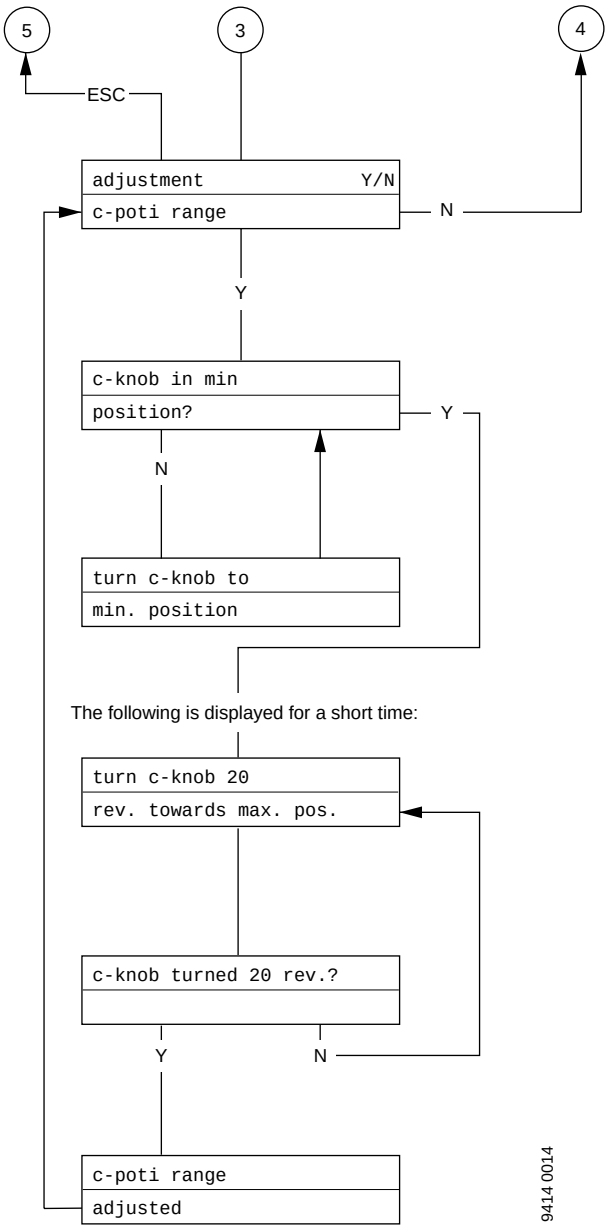


Adjustment of the Z potentiometer

Position the needle holder with the setting knob for the Z coordinate all the way down and back 1/8 of a turn. Mark the knob position!

Position the needle holder with the setting knob for the Z coordinate by eight turns upwards.

Programming mode with the pocket terminal



Adjustment of the C potentiometer

Using the knobs for manual compression, move the compression plate all the way down to lowermost position. Mark the knob position!

Move the compression plate upwards by turning the compression knob twenty turns.

Twenty turns upwards equals 100 mm from the object table

Programming mode with the pocket terminal

Module 06 “POTI OFFSET”

This program matches the evaluation unit to the “actual value” potentiometers of the biopsy unit. For this purpose, it is necessary to make a stereo exposure acc. to the following:

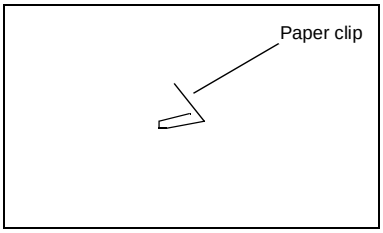
Procedure

1 Attach the compression plate. Attach the biopsy unit.

2 Select stereotactic mode on the stand by moving the rear lever towards the stand.

3 Insert the film cassette into the table.

4 Place a stereo phantom, or, if not available, a long-narrow metal object on the object table, for example a straightened out paper clip. Using the compression plate as reference, adjust the object so that its point - the space point - aligns with the following coordinates: X = 0, Y = 15 and Z = 50, ± 5 mm. Secure the object in this position. See example in adjacent figure.



5 Select 28 kV and AEC mode at the control panel.

6 Make the stereo exposure (see Operating Instructions, page 18).

7 Develop the exposed film.

NOTE

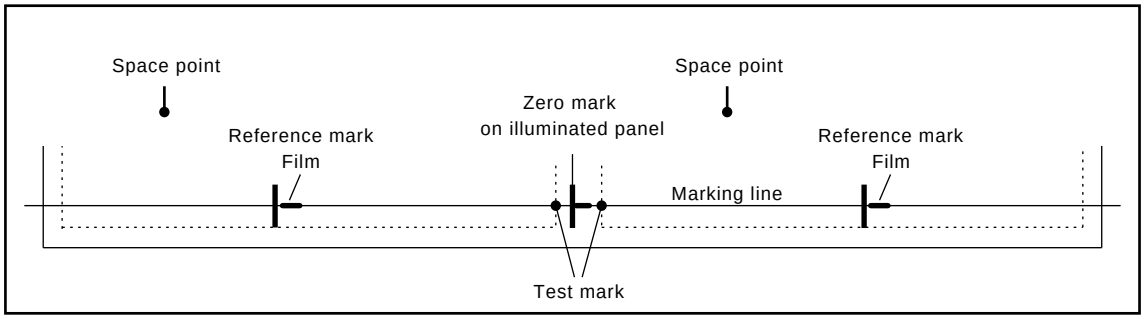
The evaluation accuracy of the stereo exposure is dependent on the following settings.

1 Place the film on the illuminated panel of the evaluation unit, under the measuring crosses.

NOTE

To ensure correct orientation of the film in the evaluation unit, two reference marks are exposed onto the film (see figure below).

2 Align the two reference marks of the film with the marking line on the illuminated panel.



3 Press the ⇳ key to lock the film in position.

4 Have the two measuring crosses of the evaluation unit coincide with the two reference marks of the film.

5 Press the “ZERO SET” key.
The displays for the X, Y and Z coordinates on the evaluation unit shall all read 000.0.

6 Have the two measuring crosses coincide with the two space-point images.

7 Press the “POSITION SET” key.
The evaluation unit now indicates the position of the space point for the X, Y and Z coordinates.

8 Select the desired needle length at the evaluation unit. Measure the needle length to verify that correct length has been selected.

9 Insert the biopsy needle into the needle guides all the way to stop.

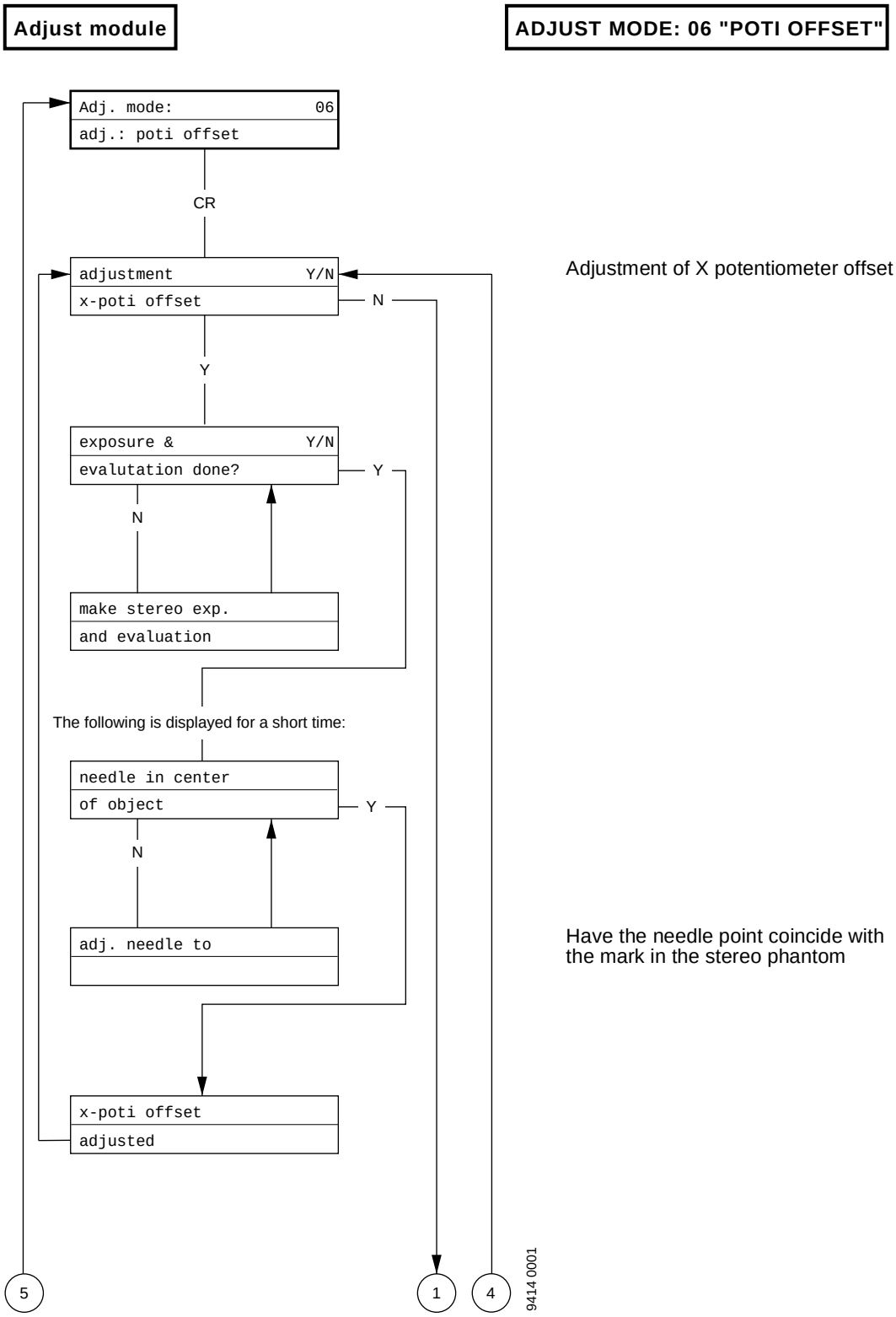
10 At the biopsy unit, have the needle coincide with the space point of the metal object (X = 0, Y = 15, Z = 50. Tolerances: ± 5 mm).

11 Using the pocket terminal, execute Adjust Mode 06: Adj. Poti offset, program parts:
X poti offset
Y poti offset
Z poti offset.

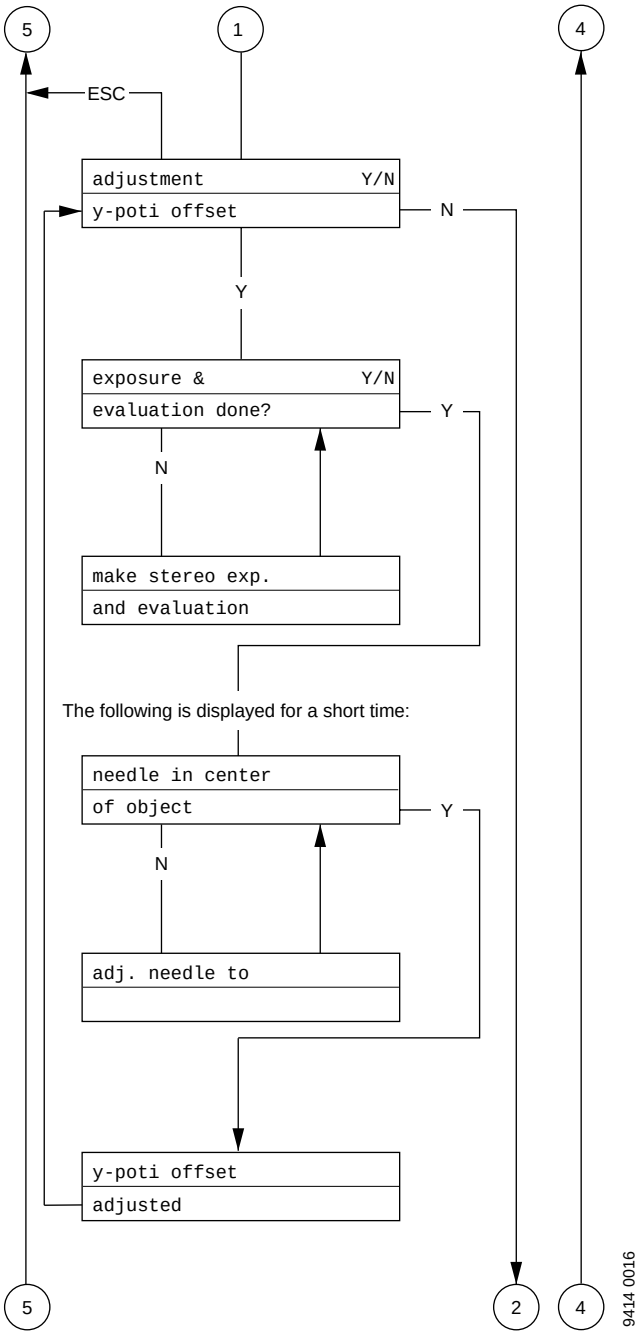
Do not select program part C potentiometer offset here!

After termination of Adj. Mode 06, 00.0 must be indicated for the X, Y and Z coordinates on the biopsy unit.

Programming mode with the pocket terminal



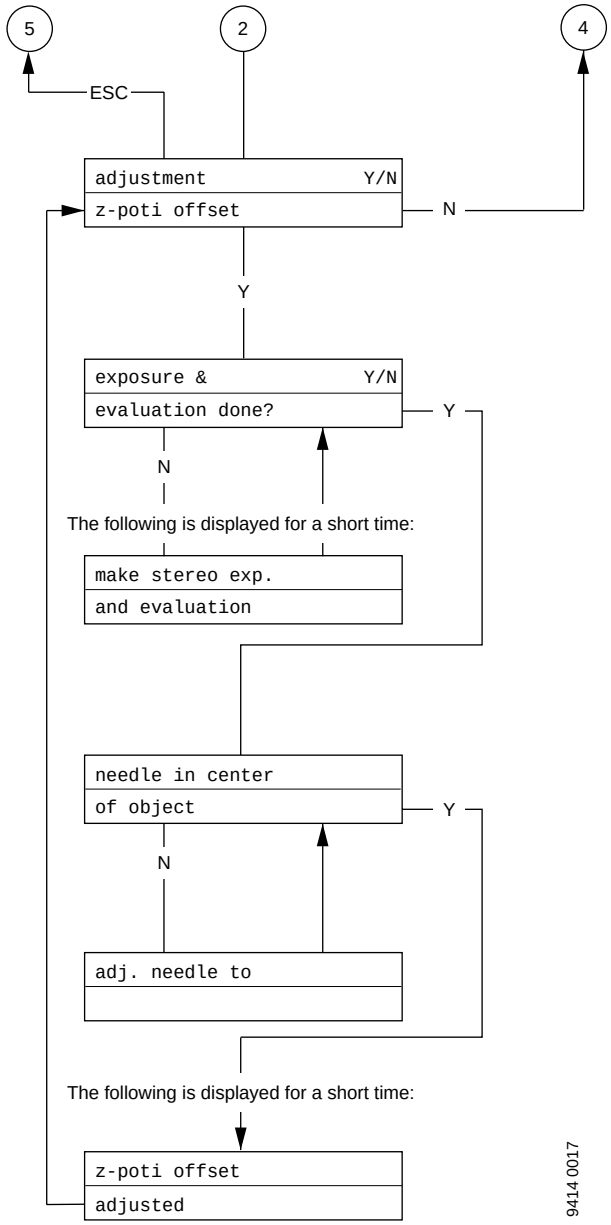
Programming mode with the pocket terminal



Adjustment of Y potentiometer offset

Have the needle point coincide with the mark in the stereo phantom

Programming mode with the pocket terminal



Adjustment of Z potentiometer offset

Have the needle point coincide with the mark in the stereo phantom

Module 07 “ADJ. COMP. OFFSET”

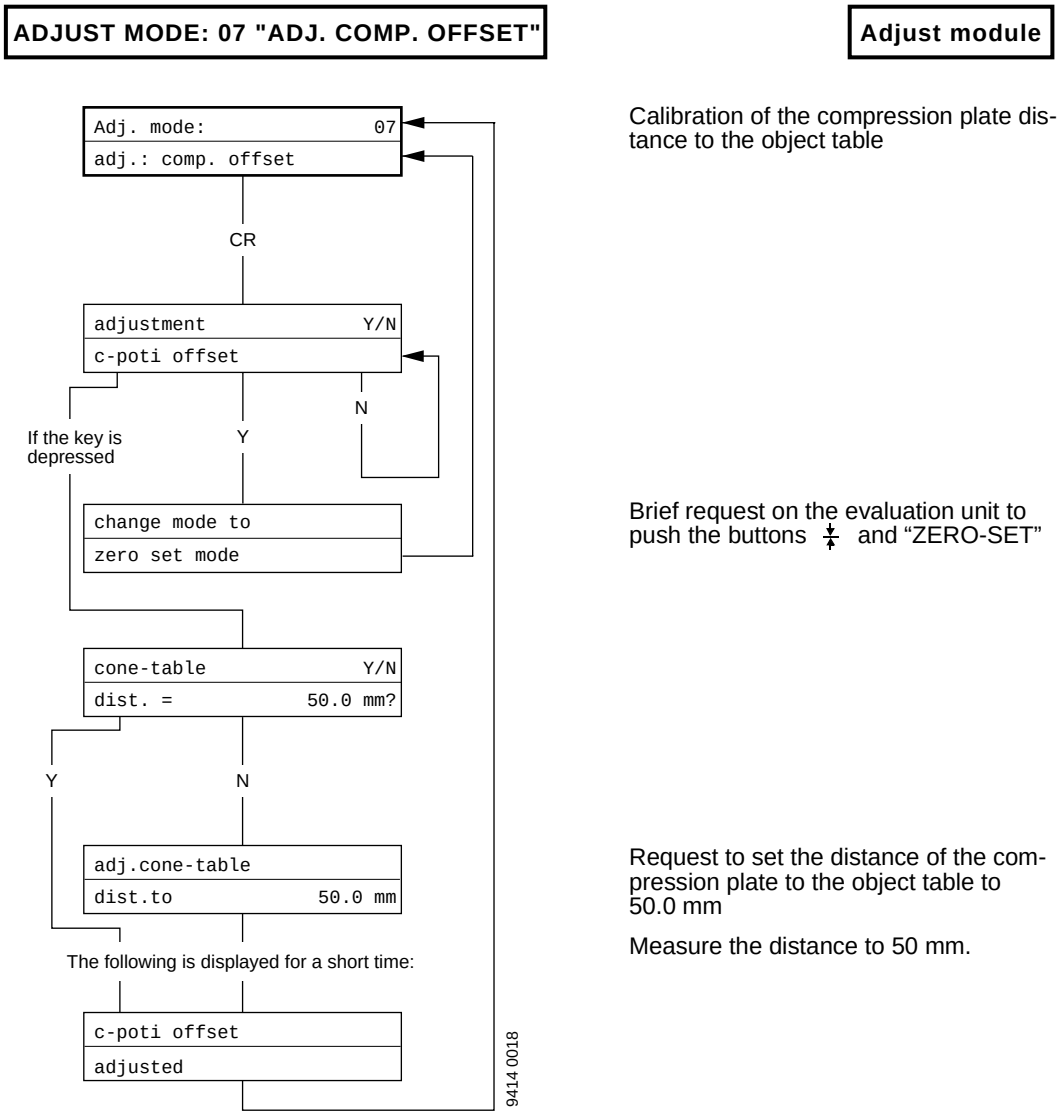
NOTE

This program part can be executed only if the evaluation unit is in the “ZERO SET” mode.

For this purpose:

1 Press the ↕ key at the evaluation unit.
The red LED in the key field lights up.

2 Press the “ZERO SET” key.
000.0 is indicated in each case for the X, Y and Z coordinates in the display field of the evaluation unit.



Module 08 “Display comp. dist.”

NOTE

This program part can be executed only if the evaluation unit is in the “ZERO SET” mode.

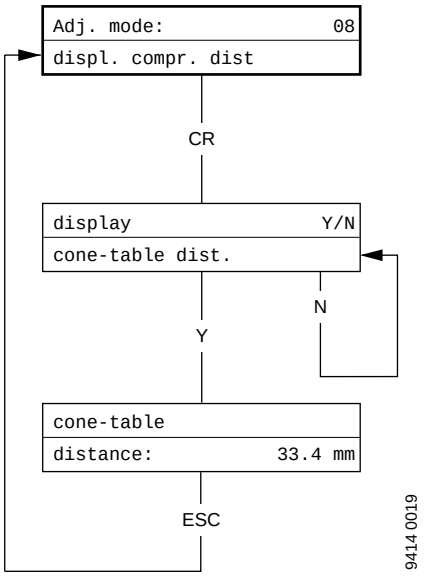
For this purpose:

1 Press the ↕ key at the evaluation unit.
The red LED in the key field lights up.

2 Press the “ZERO SET” key.
000.0 is indicated in each case for the X, Y and Z coordinates in the display field of the evaluation unit.

Adjust module

ADJUST MODE: 08 "DISPL. COMPR. DIST."



Checking the compression plate distance to the object table

Display of the actual distance between the compression plate and the object table

For checking, verify measurement

Programming mode with the pocket terminal

Final checks

1 Make a stereo exposure of the stereo phantom.

2 Place the radiograph on the illuminated panel of the evaluation unit and align it with the marking line.

3 Press the ↕ key to fix the film.

4 Press the “ZERO SET” key.

5 Adjust the two measuring crosses to the space point.

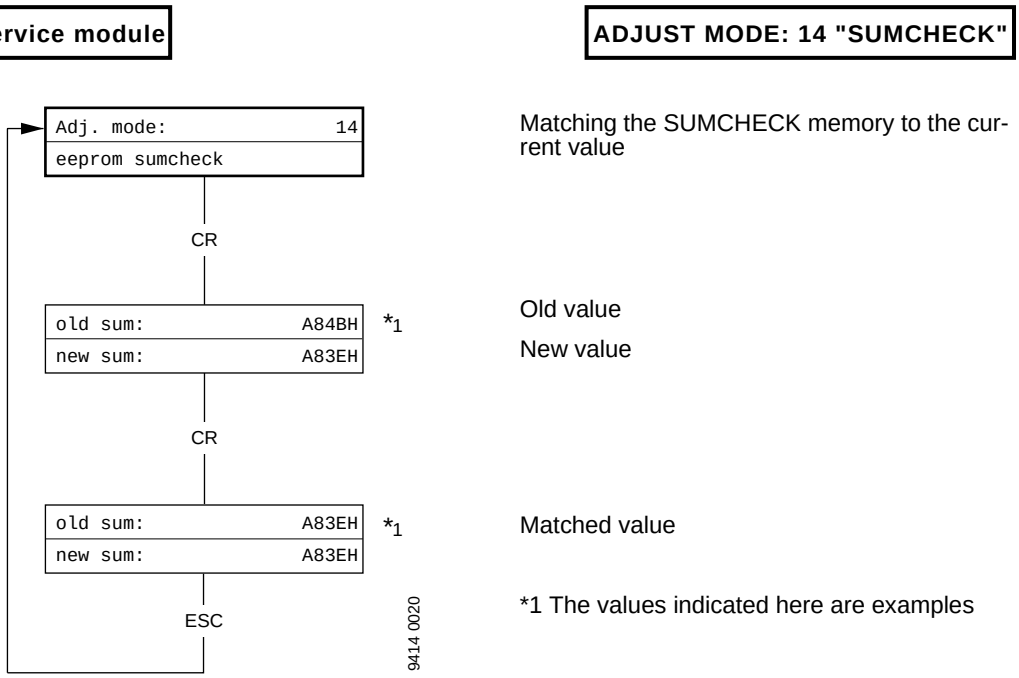
6 Press the “POSITION SET” key.

7 Select the desired needle length.

8 On the biopsy unit, set the displays for the X, Y and Z coordinates to “zero”.

9 Insert the biopsy needle into the needle guides all the way to stop.
The needle point must coincide with the space point of the stereo phantom.

Module 14 “SUMCHECK”



NOTE

If not already performed subsequently to the final checks, the jumper x8 on circuit board D11 must be refitted to 1 - 2.

Fault indication

Error indication	Meaning	Error correction
U01 to U07	Circuit board D11 in evaluation unit defective	Replace circuit board D11
U08	SUMCHECK memory not matched	Adj. Mode J14: Perform “SUMCHECK”
U09	Not assigned	-
U10	X potentiometer: extent error	X potentiometer defective or wrong mechanical adjustment
U11	Y potentiometer: extent error	Y potentiometer defective or wrong mechanical adjustment
U12	Z potentiometer: extent error	Z potentiometer defective or wrong mechanical adjustment
U13	C potentiometer: extent error	C potentiometer defective or wrong mechanical adjustment
U14	A/D converter Reference channel error (+4 V DC	Replace circuit board D11
U15	A/D converter Reference channel error (+5 V DC	Replace circuit board D11
U16	Voltage –5 V DC missing	Replace circuit board D11
U17	Voltage +4 V DC missing	Replace circuit board D11

Table 3 Fault indication